IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Kurt J. Korkowski	
Appln. No.	:	10/758,330	
Filed	:	January 15, 2004	Group Art Unit: 2627
Title	:	ENDCAP FOR REDUCING AIRFLOW EXCITATION OF HEAD GIMBAL ASSEMBLY	Examiner: Matthew Kayrish
Docket No.	:	I69.12-0614	

APPEAL BRIEF FOR APPELLANT

Mail Stop Appeal Brief - Patents
Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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December 9, 2008

This is an appeal from an Advisory Action mailed October 9, 2008 and a Final Office Action mailed July 17, 2008.

Contents

Real Party in Interest

The real party in interest is Seagate Technology LLC, which is the owner of the entire right, title, and interest in the application.

Related Appeals and Interferences

There are no known related appeals or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

Status of the Claims

I. Total number of claims in the application

	A.	Claims in the application are:	1-21

II. Status of all of the claims

	A.	Claims canceled:	2
	B.	Claims withdrawn but not canceled:	None
	C.	Claims pending:	1 and 3-21
	D.	Claims allowed:	None
	E.	Claims rejected:	1 and 3-21

III. Claims on appeal

	A.	The claims on appeal are:	1 and 3-21

Status of Amendments

No amendments have been made to the claims following the Final Office Action mailed July 17, 2008, in which claims 1 and 3-21 were finally rejected. A Response After Final was filed September 17, 2008 in response to the Final Office Action. No amendments to the claims were made in the Response After Final filed September 17, 2008. An Advisory Action mailed October 9, 2008 indicated that the rejections of claims 1 and 3-21 were maintained despite arguments presented in the Response After Final. A Notice of Appeal was filed on October 17, 2008, in which Appellant requested review of the final rejections.

Summary of Claimed Subject Matter

The present invention relates to an endcap or shield for use in a disc drive system. An exemplary disc drive actuation system 10 for positioning a slider 12 over a selected data track 14 of a magnetic storage medium (e.g., a rotatable disc) 16 can include a voice coil motor (VCM) 18 arranged to rotate a head gimbal assembly (HGA) 20 about an axis 22. The HGA 20 includes a load beam 24 and an endcap supported by an actuator arm 26. A flexible interconnect circuit 30 disposed under the actuator arm 26 can electrically connect the slider 12 to remotely located components. In order to position the slider 12 at a selected track 14 on the disc 16, the VCM 18 moves the HGA 20 about the axis 22 in an arc across the surface of the disc 16. A variety of sources of positioning error may appear, including windage-driven vibrations caused by airflow at or near the HGA 20 as the disc 16 rotates, which can be measured as non-repeatable runout (NRRO). When rotated, an airflow or windage is generated near a surface of the disc 16, which generally co-rotates with the disc 16. Asymmetric airflows produced (e.g., eddies, shedding effects, etc.) can foster excitation and vibration. Excitation and vibration of the HGA 20 may cause off-track movement of the slider 12. (Specification, p. 7, ln. 2 to p. 9, ln. 21; FIGS. 1-2C).

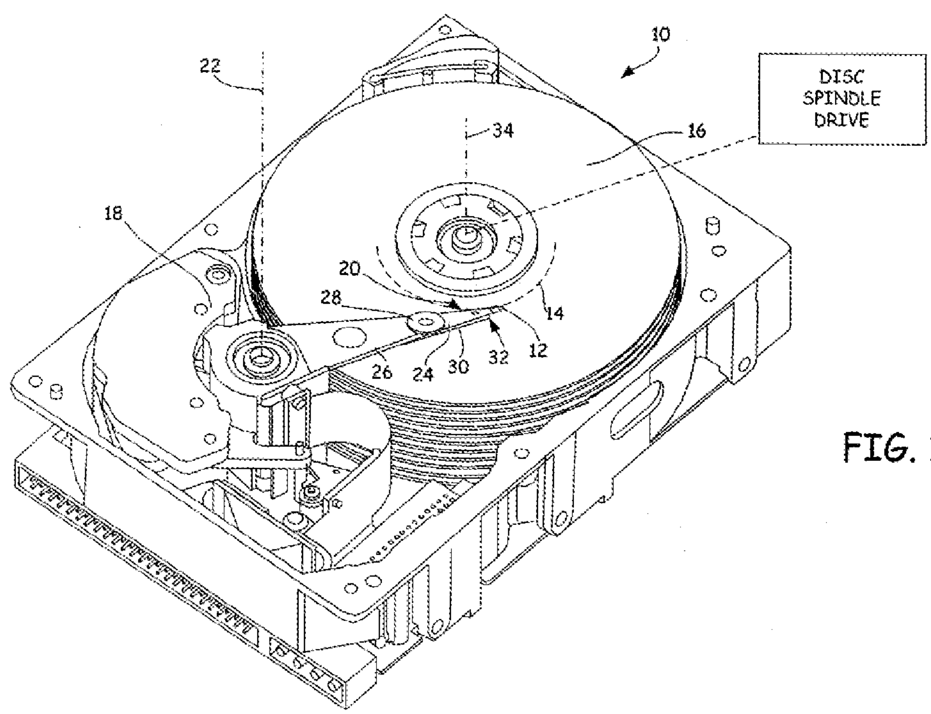

FIG. 1

FIG. 1 of the present application.

The term "endcap" is known in the art to refer to structures mechanically connected to the ends of actuator arms at or near the location where load beams/suspensions/flexures are connected, in order to provide balancing.[1] (Specification, p. 2, ln 21 to p. 3, ln. 9; p. 11, ln 23 to p. 12, ln. 19). In contrast, a "baseplate" is distinguished in the art from an endcap. Baseplates are used to connect load beams to actuator arms, with one or more baseplates often connected to a top side, bottom side, or top and bottom sides of the load beam. (Specification, p. 1, ll. 18-25).

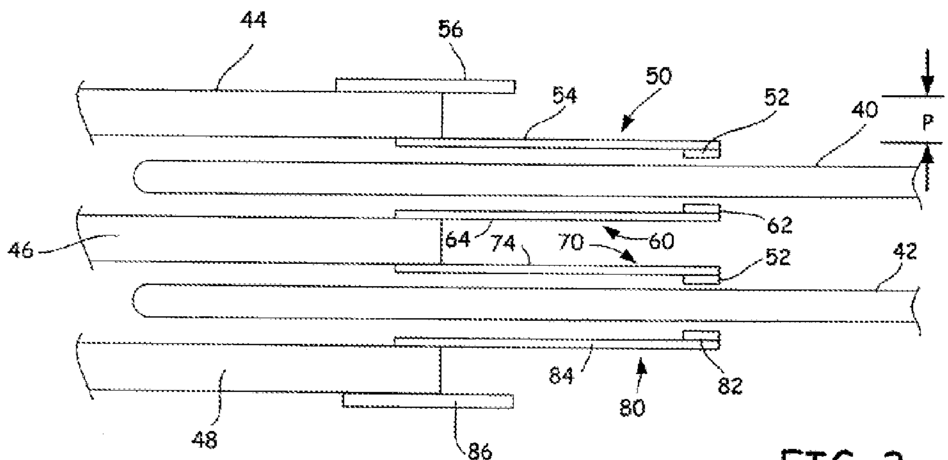

FIG. 3 of the present application.

In the embodiment illustrated in FIG. 3 of the present application, an endcap 56 is attached to a top side of a first actuator arm 44 carrying a single HGA 50 at an opposite side, and an endcap 86 is attached to a bottom side of a third actuator arm 48 carrying a single HGA 80 at an opposite side. In order to reduce excitation of the single-HGA actuator arms 44 and 48, the endcaps 56 and 86 are utilized. The endcaps 56 and 86 shown in FIG. 3 extend beyond the actuator arms 44 and 48 to shield the single HGAs 50 and 80, respectively. The endcaps 56 and 86 are shaped and positioned relative to the HGAs 50 and 80, respectively, to reduce windage (or aiflow) excitation of the HGAs 50 and 80. (Specification, p. 9, ln. 22 to p. 12, ln. 19; FIG. 3).

FIG. 4 of the present application is a perspective view of another embodiment of an actuator arm assembly 90 that includes five actuator arms 92, 94, 96, 98 and 100 arranged in a

[1] Endcap 134 shown in FIG. 4 of the present application illustrates a prior art endcap design. (Specification, p. 15, ll. 23-27).

parallel stack formation. As shown, a single HGA 110 is attached to an end of the uppermost actuator arm 92. The HGA 110 includes a slider 112, a gimbal 113, a load beam 114, and a flexible interconnect circuit 116. The flexible interconnect circuit 116 has an elbow region 118 that protrudes from the HGA 110. Attached to the actuator arm 92 at a side opposite the HGA 110 is an endcap 120. The endcap 120 has a body 122 with a swage hole 124 for connecting the endcap 120 to the actuator arm 92. The endcap 120 also includes a T-shaped shielding feature 126 that extends from the body 122, the shielding feature 126 having a balancing portion 128 and a shielding portion 130. (Specification, p. 12, ln. 20 to p. 16, ln. 2; FIG. 4).

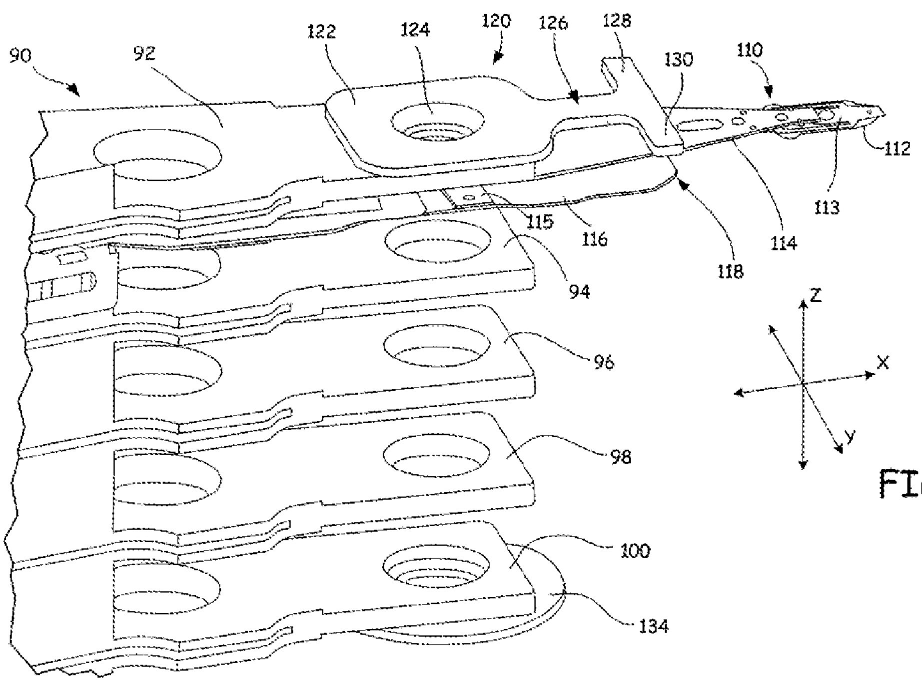

FIG. 4

FIG. 4 of the present application.

FIGS. 5-7C illustrate alternative embodiments of endcaps 140, 160, 190. A shielding feature 146 of the endcap 140 of FIG. 5 has a modified "T" shape. The endcap 160 of FIGS. 6A-6C has shape feature protrusions 166 and 172, spacer portions 168 and 174, and sunken distal ends 170 and 176 that form a symmetrical "C" shape against a body 162. The endcap 190 of FIGS. 7A-7C has shielding features 196 and 198 that extend from opposite sides of a body 192. (Specification, p. 16, ln. 3 to p. 18, ln. 21; FIGS. 5-7C). Shielding features for endcaps can be formed in additional shapes and configurations. Many differently shaped endcaps, including

those with C-, E-, H-, M-, T-, U-, V-, or Y-shaped shielding features, can also be used to provide control over windage excitation of HGAs as well as to balance loads placed on the actuator arms. (Specification, p. 18, ll. 22-27).

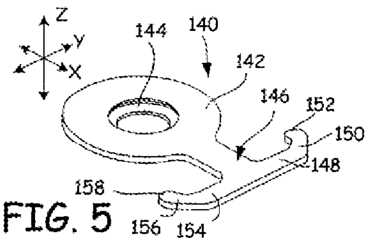

FIG. 5

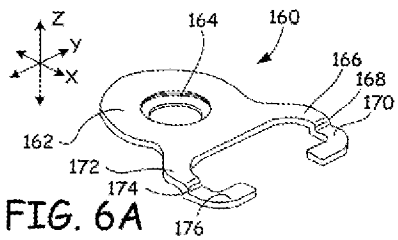

FIG. 6A

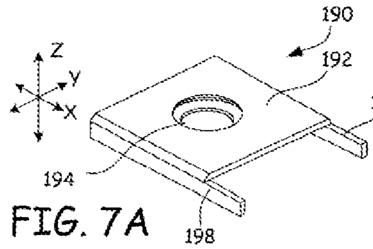

FIG. 7A

FIGS. 5 (left), 6A (middle) and 7A (right) of the present application.

Independent claim 1 relates to an endcap (56; 86; 120; 140; 160; 190) for use on an actuator arm (26; 44; 48; 92; 94; 96; 98; 100) carrying a single HGA (20; 50; 80; 110) that includes a load beam (24; 54; 84; 114), the endcap (56; 86; 120; 140; 160; 190) being connected to an end of the actuator arm (26; 44; 48; 92; 94; 96; 98; 100) to provide balancing. Independent claim 1 recites a body (122; 142; 162; 192) of the endcap (56; 86; 120; 140; 160; 190) connected to the actuator arm (26; 44; 48; 92; 94; 96; 98; 100) at a side of the actuator arm (26; 44; 48; 92; 94; 96; 98; 100) facing away from the load beam (24; 54; 84; 114), and a shielding feature (126,130; 146; 166,168,170; 172,174,176; 196; 198) extending from the body (122; 142; 162; 192) in a cantilevered configuration for reducing windage excitation of the HGA (20; 50; 80; 110). (*See, generally*, Specification, pp. 7-18 and 20; FIGS. 1 and 3-7C).

Independent claim 11 recites an actuator arm (26; 44; 48; 92; 94; 96; 98; 100), a HGA (20; 50; 80; 110) having a load beam (24; 54; 84; 114) connected to a first side of the actuator arm (26; 44; 48; 92; 94; 96; 98; 100), and a shield (56; 86; 120; 140; 160; 190) having a first portion (122; 142; 162; 192) attached to the actuator arm (26; 44; 48; 92; 94; 96; 98; 100) and a second cantilevered portion (126; 146; 166,168,170; 172,174,176; 196; 198) that extends relative to an edge portion of the HGA (20; 50; 80; 110) for reducing airflow excitation of the HGA (20; 50; 80; 110). According to independent claim 11, the first side of the actuator arm (26; 44; 48; 92; 94; 96; 98; 100) is arranged to face a magnetic storage medium (16; 40; 42). Furthermore, the shield (56; 86; 120; 140; 160; 190) is attached to a second side of the actuator arm (26; 44; 48; 92; 94; 96; 98; 100) that is opposite the first side of the actuator arm (26; 44; 48; 92; 94; 96;

98; 100) such that the shield (56; 86; 120; 140; 160; 190) extends adjacent to the HGA (20; 50; 80; 110) and the second cantilevered portion (126; 146; 166,168,170; 172,174,176; 196; 198) is spaced from the HGA (20; 50; 80; 110). (*See, generally*, Specification, pp. 7-18 and 20; FIGS. 1 and 3-7C).

Independent claim 19 relates to a shielded head actuation system and recites a rotatable actuator arm (26; 44; 48; 92; 94; 96; 98; 100), a HGA (20; 50; 80; 110) attached to a first side of the actuator arm (26; 44; 48; 92; 94; 96; 98; 100), a rotatable magnetic disc (16; 40; 42), and an endcap (56; 86; 120; 140; 160; 190) that includes a body (122; 142; 162; 192) and a symmetrically balanced shape feature (126; 146; 166,168,170; 172,174,176; 196; 198). The endcap (56; 86; 120; 140; 160; 190) provides balancing to the actuator arm (26; 44; 48; 92; 94; 96; 98; 100). Independent claim 19 recites that the first side of the actuator arm (26; 44; 48; 92; 94; 96; 98; 100) is arranged to face the rotatable magnetic disc (16; 40; 42). Furthermore, independent claim 19 recites that the body (122; 142; 162; 192) of the endcap (56; 86; 120; 140; 160; 190) be attached to a second side of the actuator arm (26; 44; 48; 92; 94; 96; 98; 100) opposite the HGA (20; 50; 80; 110) such that the shape feature (126; 146; 166,168,170; 172,174,176; 196; 198) of the endcap (56; 86; 120; 140; 160; 190) is positioned adjacent to a top face of the HGA (20; 50; 80; 110) in a cantilevered configuration to reduce airflow excitation of the HGA (20; 50; 80; 110). (*See, generally*, Specification, pp. 7-18 and 20; FIGS. 1 and 3-7C).

Grounds of Rejection to be Reviewed on Appeal

1. Whether claims 1, 3-8, 11-13 and 15-21 are obvious over Bauck et al. (U.S. Pat. No. 4,189,759) in view of Lin et al. (U.S. Pat. No. 6,961,218) under 35 U.S.C. §103(a); and

2. Whether claims 9, 10 and 14 are obvious over Bauck et al. (U.S. Pat. No. 4,189,759) in view of Lin et al. (U.S. Pat. No. 6,961,218) in further view of Nagahiro et al. (U.S. Pat. App. Pub. No. 2003/0218833) under 35 U.S.C. §103(a).

Argument

In the Final Office Action mailed July 17, 2008, claims 1 and 3-21 were rejected. Claims 1, 3-8, 11-13 and 15-21 were rejected under 35 U.S.C. §103(a) as being obvious over Bauck et al. (U.S. Pat. No. 4,189,759) in view of Lin et al. (U.S. Pat. No. 6,961,218). Claims 9, 10 and 14 were rejected under 35 U.S.C. §103(a) as being obvious over Bauck et al. in view of Lin et al. in further view of Nagahiro et al. (U.S. Pat. App. Pub. No. 2003/0218833). The limitations of independent claims 1, 11 and 19 are detailed above.

1. <u>The Cited Art</u>

a. Bauck et al. (U.S. Pat. No. 4,189)

Bauck et al. discloses a cantilevered beam assembly 20 that includes a base portion (or base plate) 22, a U-shaped guard portion 24, and a tip portion (or load beam) 26. (Bauck et al., col. 6, ll. 26-47; FIGS. 2 and 3). Element 22 of Bauck et al. refers to a base plate, as acknowledged by the Examiner. (*See* 4/2/08 Amendment, p. 7). The base portion (or base plate) 22 has holes 46, 48 and 50 for screw attachment to a carriage 152 that is not shown in FIGS. 2 and 3. (Bauck et al., col. 6, ln. 63 to col. 7, ln. 4; FIGS. 2 and 3; *see also* col. 13, ll. 14-16; FIGS. 1 and 7-9). The guard portion 24 "surrounds or enshrouds" the tip portion 26, and the claims describe the guard member (i.e., the "third member") as "being substantially in the same plane" as the base portion 22 (the "first elongated relatively flat support means") and the tip portion 26 (the "second elongated relatively flat support means"). (Bauck et al., col. 9, ll. 66-68; col. 10, ll. 43-46; col. 14, ll. 7-27; FIGS. 2 and 3). The tip portion (or load beam) 26 is a cross-shaped structure that is hingedly connected to the legs 52 and 54 of the base portion (or base plate) 22 via flexure means 36 and 38, which include leaf springs 100 and screws 102, 104, 106 and 108. (Bauck et al., col. 6, ll. 46-52; col. 8, ll. 3-7; col. 9, ll. 6-35; FIGS. 2, 3 and 6). A magnetic transducer 58 is supported by the tip portion 26. (Bauck et al., col. 8, ll. 18-21; FIG. 2).

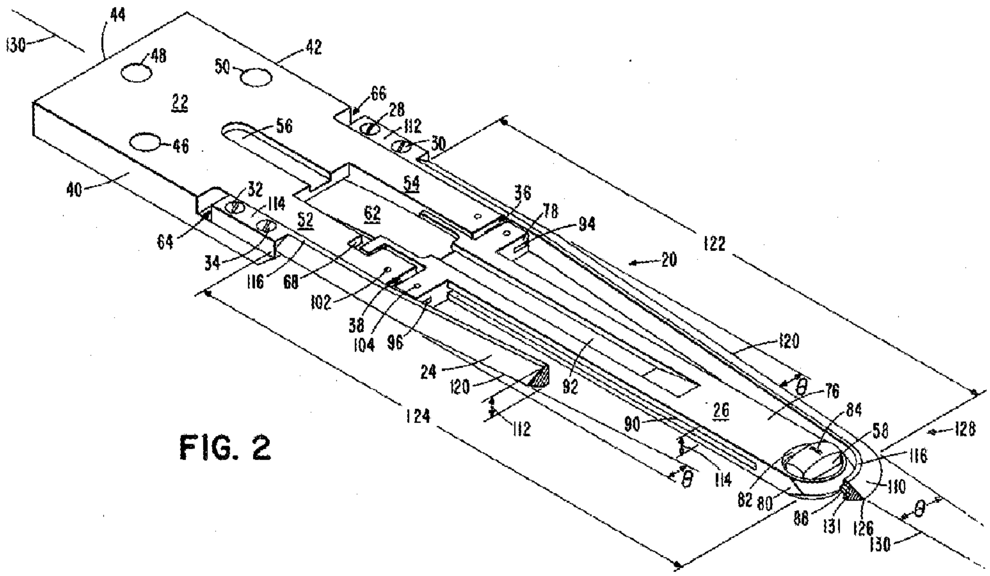

FIG. 2

FIG. 2 of Bauck et al.

As acknowledged at page 3 of the Final Office Action, Bauck et al. fails to disclose an endcap connected to an end of an actuator arm, with a body of the endcap connected at a side of the actuator arm facing away from a load beam. That characterization is correct, and must be the case because the configuration and positioning of the guard portion 24 of Bauck et al. is uniquely tied to its guard function for the insertion of an arm assembly into an opening 156 in a flexible disc file 134 (or pack). (Bauck et al., col. 11, ln. 66 to col. 12, ln. 39; FIG. 7). The guard portion 24 must be positioned in-plane with the tip portion 26 in order to perform its guard function, as Bauck et al. states:

> *the guard portion provides protection to the disk pack and head arm support while in the pack. The guard portion causes the disks to be deflected around the tip portion, thereby preventing the disk from catching onto the edges of the transducer and tip portion.*

(Bauck et al., col. 10, ll. 3-21; FIG. 7; *see also* col. 11, ln. 66 to col. 12, ln. 39; FIGS. 3 and 4).

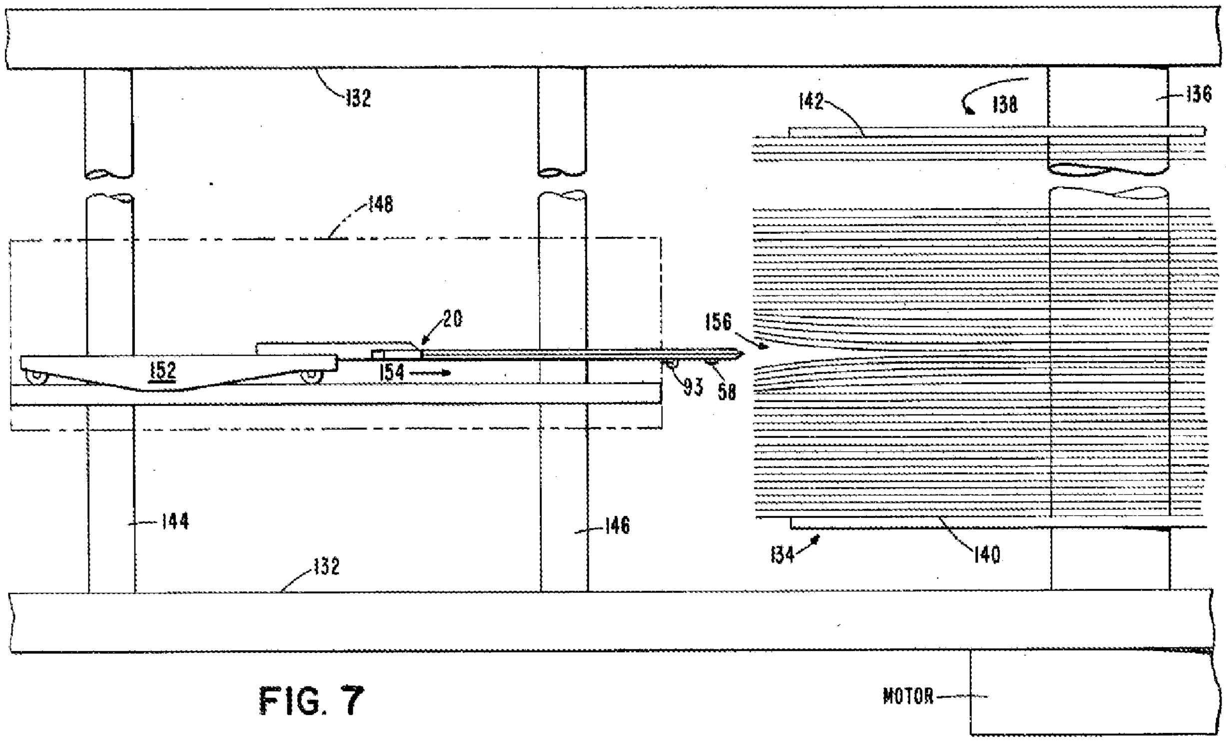

FIG. 7 of Bauck et al.

b. Lin et al. (U.S. Pat. No. 6,961,218)

Lin et al. discloses a disc drive actuator arm assembly having one or more slotted actuator arms. As shown in FIG. 6 of Lin et al., a rotatable actuator arm 160 is "bifurcated" by a through slot 164 "so as to define a first actuator arm tine 165 and a second actuator arm tine 166. As shown, the first actuator arm tine 165 is mechanically coupled to the second actuator arm tine 166 by an intra-actuator arm spacer 163 attached to the first and second actuator arm tines 165, 166." (Lin et al., col. 5, ll. 8-16; FIG. 6; *see also* col. 4, ll. 7-26; FIGS. 5, 7 and 8). The through slot 164 permits airflow through the actuator arm 160 to help dissipate heat, and helps increase stiffness of the actuator arm 160 for vibration reduction. (Lin et al., col. 5, ll. 42-54).

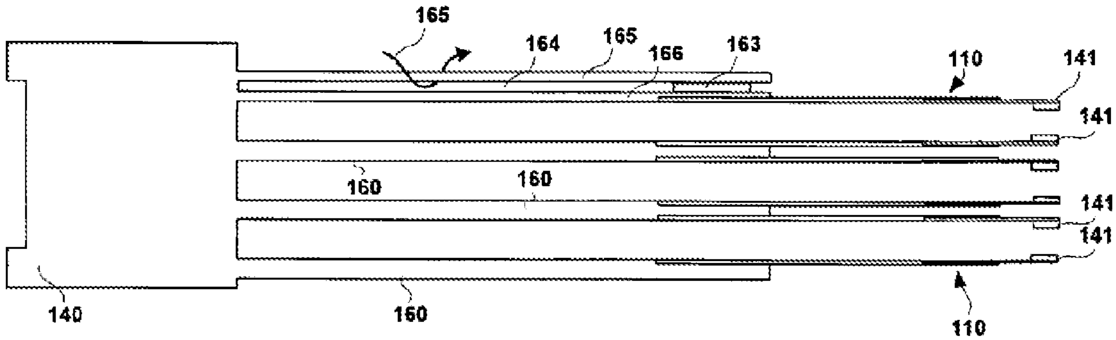

FIG. 6

FIG. 6 of Lin et al.

c. Nagahiro et al. (U.S. Pat. App. Pub. No. 2003/0218833)

Nagahiro et al. discloses a carriage arm assembly (or actuator arm assembly) for a magnetic disc drive. Nagahiro et al. discloses a suspension 2 (or load beam) that supports a slider 3 and a magnetic head (not specifically shown) at a "tip" or distal end of a rotatable carriage arm 7, and a restraint board 12 affixed to the carriage arm 7. (Nagahiro et al., ¶¶16, 35 and 36; FIGS. 1-3). The restraint board 12 is a thin T-shaped structure in the embodiment shown in FIGS 1-3 of Nagahiro et al. (Nagahiro et al., ¶36; FIGS. 1-3). Opposing arms of the restraint board 12 are affixed to arm center portions 10a and 10B with viscoelastic materials 11 and a "residual end" of the restraint board 12 is affixed to an arm root portion 13 parallel to a disc 6. (Nagahiro et al., ¶¶16 and 36; FIGS. 1-3). In other words, the restraint board 12 is resiliently secured at a middle portion of the arm 7 such that the restraint board 12 has no free or cantilevered protrusions and is spaced from the suspension 2. A vibration damping effect is thereby produced as the viscoelastic material 11 converts shearing strain energy to heat, which is then dissipated. (Nagahiro et al., ¶37). This damping effect is dependent upon the restraint board 12 being completely fixed to the arm 7 in order to produce strain in the viscoelastic material 11. Nagahiro et al does not specifically disclose the position of the suspension 2 relative to the top and bottom faces of the arm 7, though in FIG. 2 the suspension 2 appears to extend from a middle portion of the arm 7 in between the top and bottom faces of the arm 7.

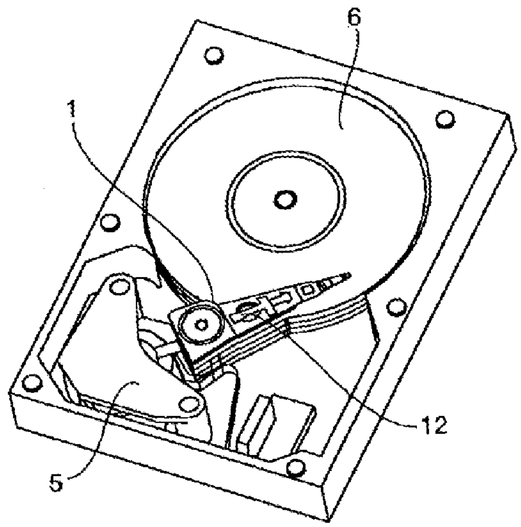

FIG. 3 of Nagahiro et al.

In further embodiments, Nagahiro discloses affixing a restraint-board-like damper body 15 of a different shape inside a hole 17 in each arm 7 of an assembly formed by a number of carriage arms 7. (Nagahiro et al., ¶¶40 and 47; FIGS. 3-6). None of the embodiments of Nagahiro et al. disclose reducing or preventing vibration by diverting airflow, but rather damping or dissipating vibrations that have developed in the disc drive. (See Nagahiro et al., ¶¶7, 13 and 17). Indeed, the function of the damping mechanism of Nagahiro et al. requires bending of the actuator arm due to vibration in order to provide a damping effect. (Nagahiro et al., ¶¶7, 13 and 17).

2. <u>Responses To The Rejections</u>

a. Section 103(a): Claims 1, 3-8, 11-13 and 15-21 Over Bauck et al. In View of Lin et al.

Claims 1, 3-8, 11-13 and 15-21 were rejected under 35 U.S.C. §103(a) as being obvious over Bauck et al. (U.S. Pat. No. 4,189,759) in view of Lin et al. (U.S. Pat. No. 6,961,218).

As discussed above, independent claims 1, 11 and 19 each recite an endcap (claims 1 and 19) or shield (claim 11) having a body (claims 1 and 19) or first portion (claim 11) connected to an actuator arm at a side of the actuator arm facing away from a load beam (claim 1) or magnetic storage medium/disc (claims 11 and 19) and a shielding feature (claim 1), second

portion (claim 11) or shape feature (claim 19) extending from the body or first portion in a cantilevered configuration for reducing windage or airflow excitation of a head gimbal assembly (HGA).

When determining whether a claim is obvious, an examiner must make "a searching comparison of the claimed invention – including all its limitations – with the teaching of the prior art." *In re Ochiai*, 71 F.3d 1565, 1572 (Fed. Cir. 1995). Thus, "obviousness requires a suggestion of all limitations in a claim." *CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003), *citing In re Royka*, 490 F.2d 981, 985 (C.C.P.A. 1974). In making an obviousness rejection, the Examiner bears the burden of establishing a *prima facie* case of obviousness based on the prior art. The Examiner can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. *In re Fritch*, 972 F.2d 1260, 1265 (Fed. Cir. 1992) (citations omitted). The Examiner has the initial duty of supplying the requisite factual basis, and may not rely upon speculation, assumption or hindsight reconstruction to supply deficiencies in the factual basis. *In re Warner*, 37 F.2d 1011, 1017 (C.C.P.A. 1967), *cert denied*, 389 U.S. 1057 (1968). Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. ____, 127 S.Ct. 1727, 1741 (2007), *quoting In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). "That one can *reconstruct* and / or explain the theoretical mechanism of an invention by means of logic and sound scientific reasoning does not afford the basis for an obviousness conclusion unless that logic and reasoning also supplies sufficient impetus to have led one of ordinary skill in the art to combine the teachings of the references to make the claimed invention." *Ex parte Levengood*, 28 USPQ.2d 1300, 1302 (Bd. Pat. App. & Inter. 1993) (emphasis in original); *see also* M.P.E.P. §2142 (warning against the use of hindsight bias in making obviousness rejections).

However, the M.P.E.P. warns against improper obviousness combinations. "If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification."

M.P.E.P. §2143.01(V), *citing In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984). Also, "[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." M.P.E.P. §2143.01(VI), *citing In re Ratti*, 270 F.2d 810 (C.C.P.A. 1959).

Bauck et al. in view of Lin et al. fail to disclose, teach or suggest each and every limitation of independent claims 1, 11 and 19, because those references cannot be combined in the manner suggested in the Final Office Action and Advisory Action to produce the present invention as claimed. The guard portion 24 of Bauck et al. is useful for its intended purpose of surrounding the transducer 58 when inserted into the flexible disc file 134 (or pack) only because the guard portion 24 is positioned in-plane with the tip portion 26 (or load beam). In suggesting a modification of the teachings of Bauck et al. based on Lin et al., the Final Office Action cites Lin et al. as disclosing an "endcap (figure 6, item 165; column 5, lines 11-12) for use on an actuator arm . . . wherein the endcap is connected to a [sic] an end of the actuator arm to provide balancing (column 5, lines 8-26 & 42-54) . . . ." (7/17/08 Office Action, pp. 3-4). The Final Office Action further identifies element 165 of Lin et al. as being a body of the endcap connected to the actuator arm at a side facing away from the load beam. (7/17/08 Final Office Action, p. 4).

However, modifying the teachings of Bauck et al. to reposition the guard portion 24 at a top surface of the support arm assembly, as presently claimed for airflow or windage excitation reduction, would render the guard portion 24 unsuitable for its intended purpose of protecting the sensitive and fragile tip portion 26 carrying the transducer 58 during insertion into and removal from the opening 156 in the flexible disc file 134 (or pack). Bauck et al. discusses at length how the guard portion 24 protects both the transducer 58 carried by the tip portion 26 and the discs in the pack 134, and that functionality is the critical reason why the guard portion 24 is present at all. Repositioning the guard portion 24 of Bauck et al. to the top surface of the support arm assembly would move the guard portion away from the tip portion 26 and the transducer 58 and thereby undesirably expose the transducer 58 to contact with discs in the pack 134 at an opposite bottom surface of the support arm assembly. This would be an unacceptable situation that is

against the express teachings of Bauck et al., and would make the invention of Bauck et al. unsuitable for its intended purpose. *See KSR*, 550 U.S. at ____, *citing United States v. Adams,* 383 U.S. 39, 51-52 (1966) (noting that the prior art teaching away from a claimed invention can tend to indicate nonobviousness). Thus, there is no motivation to modify Bauck et al. in the manner suggested in the Final Office Action.

The Advisory Action states that "the combination is made based on that [sic] the end cap of Bauck [et al.] being placed would necessarily encompass any reconstruction needed such that the guard will still perform its basic functions." And further states that "the base portion can [sic] have been reconstructed such that the guard was attached to the top of the base plate while protecting the transducer, thus, the reconstruction would not alter the basic performance." However, no factual basis is provided in either the Final Office Action or the Advisory Action as to how that would be accomplished. The Advisory Action is conclusory, and does not provide a logical, reasoned explanation as to how a person of ordinary skill in the art would have repositioned the guard portion 24 of Bauck et al. from its explicitly disclosed position (in-plane with the tip portion 26) yet have it remain in the same position to protect the tip portion 26 carrying the transducer 58. That proposition is merely assumed, which is improper. *KSR*, 550 U.S. at ____, *quoting In re Kahn*; *In re Warner*, 37 F.2d at 1017. A person of ordinary skill in the art would have recognized that the only way the tip portion 26 carrying the transducer 58 is protected according to Bauck et al. is by way of the guard portion 24 being in-plane with and surrounding the tip portion 26. Repositioning the guard portion 24 of Bauck et al. in any way would seem to necessarily eliminate this explicit function of the guard portion 26, by exposing the tip portion 26 to a greater risk of physical contact with the flexible disc file 134 at the top and/or bottom face of the tip portion 26. Repositioning the guard portion 24 would also make it impossible for the projection 88 and notch 131 to engage each other to "keep the tip portion [26] of the assembly in the protective shield as the assembly is transported to access data on a target disk." (Bauck et al., col. 8, ll. 28-37; FIGS. 2, 4 and 7).

Furthermore, Lin et al. does not contain the missing limitations of Bauck et al. Element 165 shown in FIG. 6 of Lin et al. and cited in the Final Office Action is not a component used *on* an actuator arm as stated in the Final Office Action, but rather is a *portion of a bifurcated*

actuator arm.[2] Moreover, independent claims 1, 11 and 19 each recite that the endcap or shield have a cantilevered configuration or include a cantilevered portion. Yet Lin et al. does not disclose the first actuator arm tine 165 as being cantilevered, but rather explicitly teaches away from a cantilevered configuration by providing mechanical coupling with the intra-actuator arm spacer 163 (or spacer 502 in other embodiments) to the second actuator arm tine 166. Indeed, the explicitly stated function of the bifurcation of the actuator arm 160 of Lin et al. is to enhance stiffening for vibration reduction, and cantilevered configurations are undesirable for that objective because they reduce stiffness. (Lin et al., col. 5, ln. 55 to col. 6, ln. 25; FIGS. 6-8).

The Advisory Action states that "item 165 of Lin [et al.] is connected to the actuator arm through the E-block as disclosed in figure 6." That statement finds no support in the disclosure of Lin et al. The text of Lin et al. explicitly recites elements 165 and 166 as first and second actuator arm tines. (*E.g.*, Lin et al., col. 5, ll. 10-16; FIG. 6). In other words, elements 165 and 166 of Lin et al. are two portions of a single actuator arm, and therefore cannot be applied as separate elements attached to an actuator arm. In this respect the Advisory Action is inappropriately applying Lin et al. in a manner that contradicts the explicit disclosure of that reference.

The Advisory Action further implicitly acknowledges that the cited elements of Lin et al. are not cantilevered, stating that Applicants' argument on that point are "irrelevant because Bauck [et al.] discloses this." However, far from being irrelevant, this argument actually supports the argument that Lin et al. teaches away from the obviousness combination proposed in the Final Office Action. Lin et al. specifically deals with bifurcated actuator arm configurations, and therefore does not fairly teach or suggest an endcap or shield attached to an actuator arm as recited by the present claims.

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[2] Lin et al. discloses two different elements both labeled by reference number 165: one of the actuator arm tines and an arrow designating airflow passing through the through slot 164. (Lin et al., col. 4, ll. 61-64; col. 5, ll. 10-12; FIGS. 5-8). This is an obvious error, and Lin et al. should have identified different reference numbers for those different elements. For clarity, Applicants have used reference number 165 to refer only to the first actuator arm tine in the present Appeal Brief.

The *prima facie* basis for obviousness is also deficient because a motivation for the suggested obviousness combination is lacking. *In re Kahn*, 441 F.3d at 986. Neither the Final Office Action or the Advisory Action provide a "apparent reason" available from knowledge in the prior art that would have prompted a person of ordinary skill in the art to modify or combine the cited art to arrive at the present invention. *KSR*, 550 U.S. at ___. The Final Office Action at page 4, as well as the Advisory Action, state that the proposed modifications will still cause the cited references to "function similarly" or "still perform its basic functions." However, those statements are inadequate to establish a *prima facie* basis for obviousness. Even assuming, *arguendo,* that the cited references would still perform their stated functions upon modification, such a finding alone would not establish why a person of ordinary skill in the art would have had a reason or been motivated to modify them in the first instance to provide *another* function, as recited in the present claims. Rather, this is a clear instance of improper hindsight bias. The present claims relate to a function—airflow or windage excitation reduction—that was not contemplated by the cited art. Bauck et al. deals with a shield for protecting a transducer from physical contact with a flexible disc file, and Lin et al. deals with heat dissipation and stiffening features for use in conjunction with vibration damping means. Nonetheless, the Final Office Action proposed a vague, undefined modification of the cited art to make them more complex in order to perform functions not recognized in those cited references, but only recognized by the present claims and disclosure.

In addition, the Final Office Action applies Bauck et al. to address problems that would not have been faced by the type of technology disclosed in that reference. Bauck et al. relates to a rather old storage drive design using flexible discs that bend to accommodate the transducer 58 and tip portion 26, which moves in a linear, radial path with respect to discs in the file 134. The guard portion 24 protects the tip portion carrying the transducer 58 from physical contact when in the file 134. In modern designs that do not use a flexible disc file 134, there is no need for the guard portion 24 to protect the transducer 58 and discs from physical contact and a person of ordinary skill in the art would not have considered the guard 24 relevant or adaptable to modern storage drives. Likewise, windage or airflow excitation was not identified as a problem with old disc drives like that of Bauck et al. A person of ordinary skill would have viewed Bauck et al. as

dealing with a now irrelevant problem and the guard portion 24 as being an unnecessary drive component, and would not have been motivated to modify the guard portion 24 based on Lin et al. in a manner that is contrary to the teachings of those references to address a problem (windage or airflow excitation reduction) not contemplated by the cited art. Therefore, there would have been no motivation for a person of ordinary skill in the art to combine the cited art in the manner suggested in the Final Office Action.

The Advisory Action responds to this argument by stating that the "age of a reference has no bearing on it's [sic] use in a rejection." While that statement is correct on its face, it does not rebut the specific argument made by Applicants. Namely, it is not the age *per se* of the Bauck et al. reference that counsels against its use as prior art, but rather that the disclosure of Bauck et al. is uniquely directly to an old and outdated type of disc drive that would not have a need for the functions of the present invention recited in the claims. The windage or airflow excitation concerns of modern disc drives are not experienced by the type of drive disclosed by Bauck et al. Indeed, Bauck et al. explicitly discloses purposefully generating airflows, which is contrary to the explicit recitations of the present claims regarding airflow and windage excitation reduction. (Bauck et al., col. 12, ll. 28-32; FIG. 7).

Thus, independent claims 1, 11 and 19 are allowable over the cited art, and the rejections of those claims under §103(a) are improper.

Claims 3-8 and 21 depend from independent claim 1 and include all of the limitations of that base claim, claims 12, 13 and 15-18 depend from independent claim 11 and include all of the limitations of that base claim, and claim 20 depends from independent claim 19 and includes all of the limitations of that base claim. Therefore, dependent claims 3-8, 12, 13, 15-18, 20 and 21 are likewise allowable over the cited art for the reasons given above with respect to independent claims 1, 11 and 19.

Thus, the rejections of claims 1, 3-8, 11-13 and 15-21 over Bauck et al. in view of Lin et al. under §103(a) are improper.

b. Section 103(a): Claims 9, 10 and 14 Over Bauck et al. In View of Lin et al. In Further View of Nagahiro et al.

Claims 9, 10 and 14 were rejected under 35 U.S.C. §103(a) as being obvious over Bauck et al. (U.S. Pat. No. 4,189,759) in view of Lin et al. (U.S. Pat. No. 6,961,218) in further view of Nagahiro et al. (U.S. Pat. App. Pub. No. 2003/0218833). Claims 9 and 10 depend from independent claim 1 and include all of the limitations of that base claim, and claim 14 depends from independent claim 11 and includes all of the limitations of that base claim.

A person of ordinary skill in the art would not have known to combine the teachings of Bauck et al., which are directed to guards for protecting an actuator assembly inserted into a flexible disc file, or Lin et al., which are directed to stiffening and cooling an actuator arm assembly, with the teachings of Nagahiro et al., which are directed to damping or dissipating vibrations in a disc drive assembly. The cited references deal with different, unrelated problems. The references are not compatible or modifiable in a way that would produce the present invention as claimed. *See* M.P.E.P. §2143.01(II). The damping effect provided by Nagahiro is dependent upon its restraint board 12 being completely fixed to the arm 7 (i.e., <u>not</u> being cantilevered) in order to produce vibration-dissipating strain in the viscoelastic material 11. Thus, combining the teachings of the cited references would undermine the recitations of base claims 1 and 11 regarding a cantilevered configuration or cantilevered portion, and the proposed modifications would impermissibly change the principle of operation of the cited art.

The M.P.E.P. discusses a Federal Circuit case where "[t]he prior art perceived a need for mechanisms to dampen resonance, whereas the inventor eliminated the need for dampening via the one-piece gapless support structure. 'Because that insight was contrary to the understandings and expectations of the art, the structure effectuating it would not have been obvious to those skilled in the art.'" M.P.E.P. §2141.02(I), *citing Schenck v. Nortron Corp.*, 713 F.2d 782, 785 (Fed. Cir. 1983) (citations omitted); *see also KSR*, 550 U.S. at ____, *citing United States v. Adams,* 383 U.S. at 51-52. This example case described in the M.P.E.P. bears remarkably similarities to the present rejection. Specifically, the Final Office Action has cited the dampener structure of Nagahiro et al. against the structures recited in the present claims that reduce airflow or windage excitation, which inherently reduce or eliminate the need for dampeners. In that

respect, when the present claims are properly viewed as a whole they achieve more than the mere structural differences from the prior art might otherwise suggest, and the prior art teaches away from the present invention as claimed. This supports a finding of nonobviousness.

Furthermore, the limitations of base claims 1 and 11 are missing from Bauck et al. and Lin et al., as discussed above, and Nagahiro et al. does not supply those missing limitations.

Thus, the rejection of claims 9, 10 and 14 over Bauck et al. in view of Lin et al. in further view of Nagahiro et al. under §103(a) is improper.

Conclusion

In view of the foregoing, it is respectfully requested that the appeal of claims 1 and 3-21 be granted, such that pending claims 1 and 3-21 of the present application are allowed.

Respectfully submitted,

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Claims Appendix

1.**(Previously Presented)** An endcap for use on an actuator arm carrying a single head gimbal assembly that includes a load beam, wherein the endcap is connected to an end of the actuator arm to provide balancing, the endcap comprising:

a body of the endcap connected to the actuator arm at a side of the actuator arm facing away from the load beam; and

a shielding feature extending from the body in a cantilevered configuration for reducing windage excitation of the head gimbal assembly.

2.**(Canceled)**

3.**(Previously Presented)** The endcap of claim 1, wherein the shielding feature includes a balancing portion and a shielding portion.

4.**(Previously Presented)** The endcap of claim 3 wherein the shielding feature is not connected to the actuator arm.

5.**(Previously Presented)** The endcap of claim 3 wherein the balancing portion is shaped so the endcap is symmetric with respect to the shielding portion and the balancing portion.

6.**(Original)** The endcap of claim 1, wherein the shielding feature is structured to divert an airflow proximate to a portion of the head gimbal assembly that experiences windage excitation.

7.**(Previously Presented)** The endcap of claim 6 wherein the shielding feature is structured to divert airflow away from a windward side of the head gimbal assembly.

8.**(Original)** The endcap of claim 1 wherein the head gimbal assembly further comprises a load beam, a gimbal, a transducing head, and a flexible interconnect circuit, and wherein the shielding feature is structured to divert an airflow proximate to a critical portion of the flexible interconnect circuit.

9.**(Previously Presented)** The endcap of claim 1 disposed in relation to an X, Y and Z coordinate system, wherein an airflow in a substantially Z direction causes excitation of the head gimbal assembly, the shielding feature having a shape defined in a substantially X-Y plane for controlling the airflow, wherein the substantially X-Y plane is defined substantially parallel to the actuator arm.

10.**(Previously Presented)** The endcap of claim 1 disposed in relation to an X, Y and Z coordinate system, wherein an airflow in a substantially Y direction causes excitation of the head gimbal assembly, the shielding feature having a shape defined in a substantially X-Z plane for controlling the airflow, wherein the substantially X-Z plane is defined substantially parallel to an axis of rotation of the actuator arm.

11.**(Previously Presented)** A head actuation system comprising:

an actuator arm;

a head gimbal assembly for carrying a transducing head, the head gimbal assembly having a load beam connected to a first side of the actuator arm; and

a shield having a first portion attached to the actuator arm and a second cantilevered portion for reducing airflow excitation of the head gimbal assembly, wherein the shield is attached to a second side of the actuator arm that is opposite the first side of the actuator arm.

12.**(Previously Presented)** The head actuation system of claim 11, wherein the shield is attached to a first end of the load beam, and wherein the head gimbal assembly comprises:

a flexible interconnect circuit adjacent to the load beam and electrically connected to the transducing head;

a gimbal attached to a second end of the load beam; and

a slider supported by the gimbal, the slider disposed to support the transducing head.

13.**(Previously Presented)** The head actuation system of claim 11 wherein the shield is an endcap wherein the first portion of the shield is a body of the endcap and wherein the second portion of the shield is a symmetrical protrusion from the body of the endcap.

14.**(Original)** The head actuation system of claim 13 wherein the protrusion is T-shaped.

15.**(Previously Presented)** The head actuation system of claim 11 wherein the shield is an endcap connected to an end of the actuator arm to provide balancing, the endcap having a body and a plurality of protrusions from the body.

16.**(Original)** The head actuation system of claim 15 wherein the endcap is symmetrical with respect to an axis extending along a center length of the load beam.

17.**(Original)** The head actuation system of claim 16 wherein the protrusions form substantially a “C” shape.

18.**(Previously Presented)** The head actuation system of claim 17 wherein at least one of the plurality of protrusions has a first portion and a distal portion, the first portion defines a plane, and the distal portion defines another plane.

19.**(Previously Presented)** A shielded head actuation system comprising:

a rotatable actuator arm;

a head gimbal assembly attached to a first side of the actuator arm;

a rotatable magnetic disc, wherein the first side of the actuator arm is arranged to face the rotatable magnetic disc; and

an endcap comprising a body attached to the actuator arm and a symmetrically balanced shape feature, wherein the body of the endcap is attached to a second side of the actuator arm opposite the head gimbal assembly such that the shape feature is positioned adjacent to a top face of the head gimbal assembly in a cantilevered configuration to reduce airflow excitation of the head gimbal assembly, and wherein the endcap provides balancing to the actuator arm.

20. **(Original)** The shielded head actuation system of claim 19 wherein the symmetrically balanced shape feature is disposed proximate to an excitable portion of the head gimbal assembly to control excitation of the head gimbal assembly caused by airflow generated by rotating the magnetic disc.

21.**(Previously Presented)** The endcap of claim 1, wherein a portion of the head gimbal assembly defines a first plane and the shielding feature of the endcap defines a second plane that is arranged substantially parallel to and spaced from the first plane.

Evidence Appendix

1. Evidence entered by the Examiner and relied upon by the Appellant:

   None.

2. Evidence relied upon by the Examiner as to grounds of rejection to be reviewed on appeal:

   Bauck et al., U.S. Pat. No. 4,189,759 (entered into the record by the Examiner in the July 17, 2007 Office Action).

   Lin et al., U.S. Pat. No. 6,961,218 (entered into the record by the Examiner in the July 17, 2008 Office Action).

   Nagahiro et al., U.S. Pat. App. Pub. No. 2003/0218833 (entered into the record by the Examiner in the August 23, 2006 Office Action).

Related Proceedings Appendix

None.

Table of Authorities Appendix

1. *In re Ochiai*, 71 F.3d 1565 (Fed. Cir. 1995).
2. *CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333 (Fed. Cir. 2003).
3. *In re Fritch*, 972 F.2d 1260 (Fed. Cir. 1992).
4. *In re Warner*, 37 F.2d 1011 (C.C.P.A. 1967).
5. *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. ____, 82 USPQ.2d 1385 (2007).
6. *Ex parte Levengood*, 28 USPQ.2d 1300 (Bd. Pat. App. & Inter. 1993)
7. M.P.E.P. §2142.
8. M.P.E.P. §2143.01.
9. *In re Kahn*, 441 F.3d 977 (Fed. Cir. 2006).
10. M.P.E.P. §2141.02.